

WHAT IS CLAIMED IS:

1. An image sensing device comprising:

light source means;

5 a recording member on which an image is formed and conveyed in one direction;

illumination means for causing a light beam emitted from said light source means to obliquely illuminate said recording member; and

10 imaging means for condensing specularly reflected light from the image on said recording member and causing the reflected light to travel to a surface of light receiving means, said image sensing device obtaining positional information of the image on said recording member on the basis of a signal obtained by
15 said light receiving means,

wherein when the amount of displacement of the recording member in a vertical direction during conveyance of said recording member is d , an angle between the optical axis of said imaging means and a
20 normal to said recording member is θ (degrees), and resolution of the image formed on said recording member is R (dpi), the components are set so that

$d \cdot \tan \theta < (25.4/R) \times 1000$ is satisfied.

25 2. A device according to claim 1, wherein the angle θ (degrees) satisfies

$5^\circ < \theta < 35^\circ$.

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3. A device according to claim 1, wherein said
light source means comprises an LED light source, and
said illumination means includes an illumination lens
for condensing a light beam from said LED light source
5 and causing the light beam to travel to said recording
member.

4. A device according to claim 1, wherein said
imaging means includes an imaging lens for forming, on
10 a surface of said light receiving means, an image on
said recording member.

5. A device according to claim 1, further
comprising an imaging lens for forming, the image on
15 the recording member onto said light receiving means,
wherein when imaging magnification of said imaging lens
is assumed to be β ,

$$0.75 < |\beta| < 1.25 \text{ is satisfied.}$$

20 6. A device according to claim 1, wherein the
angle θ (degrees) satisfies

$$25^\circ < \theta < 35^\circ.$$

7. An image forming apparatus including an image
25 sensing device according to any one of claims 1 to 6,
wherein said image forming apparatus forms a color
image by using said image sensing device.

8. An image sensing device comprising:

light source means;

illumination means including an irradiation lens
for irradiating, with a light beam from said light
5 source means, a recording member on which an image is
formed; and

imaging means including an imaging lens for
forming, onto a surface of a light receiving means, the
image on said recording member, said image sensing
10 device detecting the image on the recording member on
the basis of a signal obtained by said light receiving
means,

wherein when said recording member has a specular
reflection surface, a stop is provided at or close to a
15 position to be conjugate with the light emitting point
of said light source means.

9. A device according to claim 8, wherein when
the imaging magnification at which the light emitting
20 point of said light source is imaged at the conjugate
position is assumed to be β ,

$1 < |\beta| < 7$ is satisfied.

10. A device according to claim 8, wherein the
25 aperture of the stop has a size substantially equal to
or smaller than the size of the image of the light
emitting point of said light source means.

11. A device according claim 8, wherein the stop is disposed between said imaging means and said light receiving means.

5 12. A device according to claim 8, wherein said light receiving means detects the image formed on said recording member to obtain positional information of the image.

10 13. A device according to claim 8, wherein said light receiving means detects density of the image formed on said recording member.

15 14. An image forming apparatus including an image sensing device according to any one of claims 8 to 13, wherein said image forming apparatus forms a color image by using said image sensing device.

15. An image sensing device comprising:

20 light source means;

illumination means including an irradiation lens for irradiating, with a light beam from said light source means, a recording medium on which an image is formed; and

25 imaging means including an imaging lens for forming, onto a surface of a light receiving means, the image on the recording medium, said image sensing

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device detecting the image on said recording member on the basis of a signal obtained by said light receiving means,

wherein said irradiation lens and said imaging
5 lens are formed integrally with each other and made of a same material.

16. A device according to claim 15, wherein at least one of said irradiation lens and said imaging
10 lens has at least one rotationally symmetrical aspherical surface.

17. A device according to claim 15, wherein at least one of said irradiation lens and said imaging
15 lens has at least one anamorphic surface.

18. A device according to claim 15, wherein at least one surface of said irradiation lens and said imaging lens is inclined relative to a surface normal
20 to said recording member.

19. A device according to claim 15, wherein at least one of the surface of said irradiation lens and said imaging lens on said recording member side is
25 flat.

20. A device according to claim 15, wherein an

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optical axis of said irradiation lens and an optical axis of said imaging lens have equal angles formed in opposite directions from a surface normal to said recording member.

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21. A device according to claim 15, wherein said light source means is provided with a moving mechanism capable of displacing to an arbitrary position.

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22. A device according to claim 15, wherein said light receiving means is provided with a moving mechanism capable of displacing to an arbitrary position.

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23. A device according to claim 15, wherein said imaging means has a stop, and a light emitting surface of said light receiving means and the stop are made substantially conjugate with each other when a surface of said recording member is a specular reflection

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surface.

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24. A device according to claim 15, wherein said light receiving means detects the image formed on said recording member to obtain positional information of the image.

25. A device according to claim 15, wherein said

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light receiving means detects density of the image
formed on said recording member.

26. An image forming apparatus including an image
5 sensing device according to any one of claims 15 to 25,
wherein said image forming apparatus forms a color
image by using said image sensing device.

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